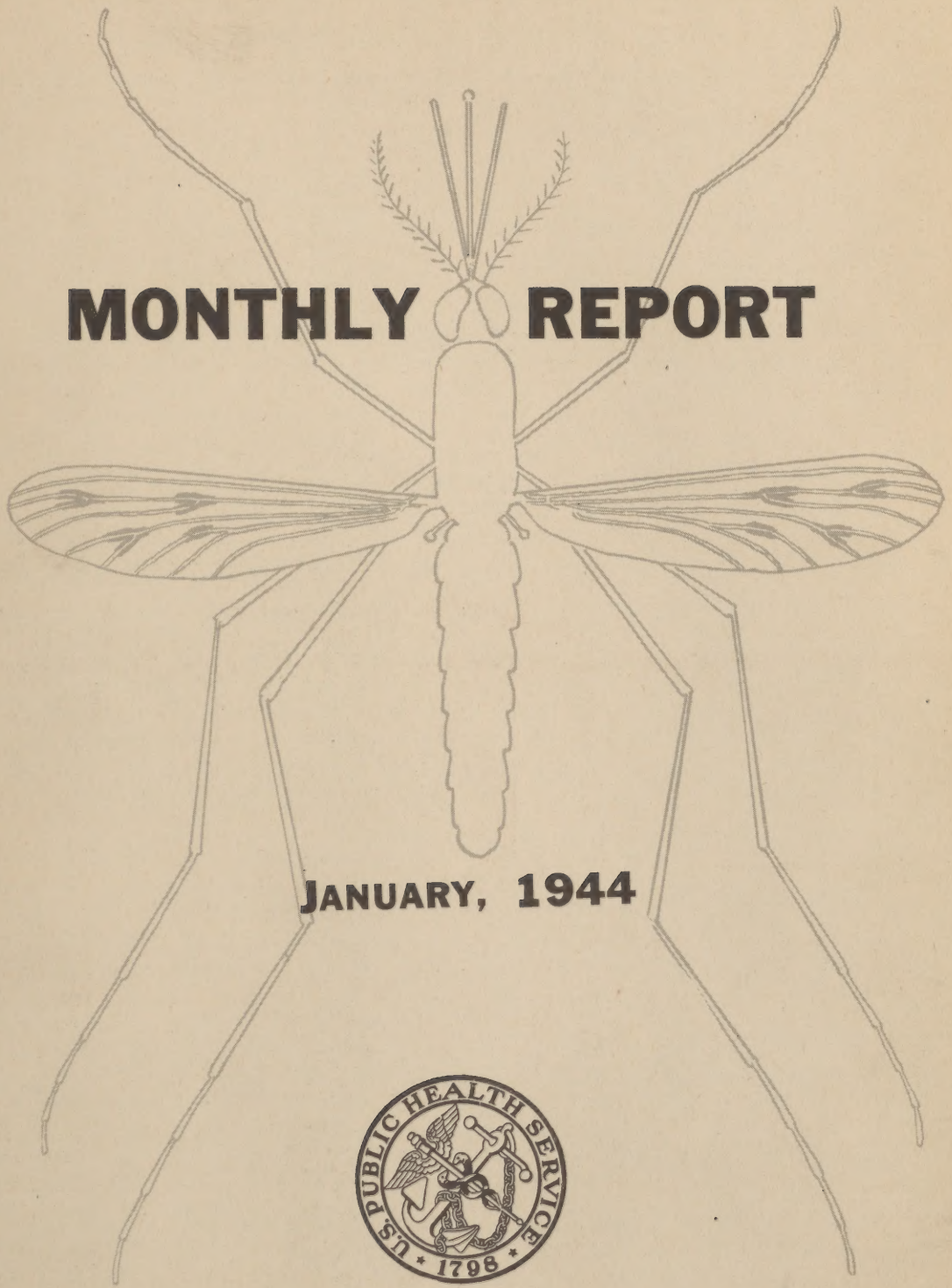
MALARIA CONTROL IN WAR AREAS



MONTHLY REPORT

JANUARY, 1944

FEDERAL SECURITY AGENCY
U. S. PUBLIC HEALTH SERVICE
ATLANTA, GEORGIA

TABLE I — MCWA LARVICIDE AND MINOR DRAINAGE PROJECTS — JANUARY 1 - 31, 1944

STATE	Areas in Operation	War Establishments Protected	LARVICIDAL WORK			OTHER WORK					Total Man Hours	Average No. Men Employed
			Larvicide Used		Surfaces Treated	Ditching		Cleaning	Clearing	Water Surf. Eliminated		
			Oil Gals.	Paris Green Lbs.	Acres	Cu.Yds.	Lin.Ft.	Lin.Ft.	Acres	Acres		
Alabama	4	73	---	---	---	1,385	2,600	3,300	7.0	2.8	3,586	17
Arkansas	6	70	---	---	---	1,919	17,403	42,653	5.1	2.0	10,272	53
California	4	29	---	---	---	1,175	14,822	26,929	6.6	1.6	4,378	23
D. C.	1	25	---	---	---	361	2,248	2,484	0.2	---	2,042	10
Florida	16	141	4,956	---	89.0	7,822	51,953	173,750	12.9	75.0	34,780	200
Georgia	12	101	---	16	13.8	1,730	11,340	77,124	14.0	15.6	22,913	118
Illinois**	1	56	---	---	---	---	---	---	---	---	928	5
Kentucky	2	45	---	---	---	39	250	---	---	---	448	3
Louisiana	8	68	1,433	947	563.3	6,621	69,304	309,969	35.4	42.5	45,461	310
Maryland	1	29	---	---	---	204	1,375	4,725	1.5	2.4	2,268	17
Mississippi	5	55	---	---	---	1,473	11,739	43,550	13.7	11.2	8,821	54
Missouri	3	34	---	---	---	197	1,330	1,500	0.3	---	2,200	15
North Carolina	9	72	---	---	---	2,596	28,394	164,226	9.3	38.5	16,173	86
Oklahoma***	1	38	---	---	---	---	---	---	---	---	1,572	9
Puerto Rico*	4	19	80	3,549	5,787.6	1,956	18,372	175,212	5.8	0.9	31,057	420
South Carolina	2	111	---	---	---	799	4,300	2,140	1.9	1.4	2,812	13
Tennessee	2	69	---	---	---	1,113	4,235	7,390	11.5	8.5	6,703	39
Texas	13	164	1,401	12	85.8	3,265	26,903	195,984	71.2	30.1	27,206	160
Virginia	4	99	---	---	---	5,297	78,777	15,644	29.5	---	19,464	129
Total	99	1,298	7,870	4,524	6,539.5	37,952	345,345	1,246,580	225.9	232.5	243,084	1,681
December Total	107	1,298	14,200	8,567	11,838.3	36,513	809,312	1,884,067	329.9	216.1	287,604	1,777

* Figures are for two weeks work only.
** Mapping, moving equipment Etc.
*** Reconnaissance Surveys.

TABLE II — MCWA MAJOR DRAINAGE PROJECTS — JANUARY 1 - 31, 1944

STATE	No. of Projects	Clearing Brushing Acres	Channel or Ditch Cleaning Lin.Ft.	New Ditching				Fill Cu.Yds.	Ditch Lining Placed		Underground Drains Lin.Ft.	Water Surf. Eliminated Acres	Total Man Hours
				Hand	Lin.Ft. Mach.	Dynamite	Total Cu.Yds.		Sq.Ft.	Lin.Ft.			
Alabama	2	2.5	12,300	---	---	1,400	835	---	---	---	---	3.0	3,120
Arkansas	2	0.4	675	2,583	1,370	840	3,778	---	---	---	1,615	1.1	1,770
Florida	1	---	4,100	573	---	1,000	643	---	---	---	---	---	2,273
Indiana	1	0.4	---	1,150	---	---	154	---	---	---	---	---	990
Kentucky	2	1.3	---	3,050	---	---	453	---	---	---	---	---	2,114
Louisiana	1	8.8	---	---	---	---	---	---	---	---	---	---	4,017
Mississippi	2	1.4	5,000	880	---	---	111	39	775	240	---	0.1	2,462
Missouri	1	---	---	---	---	1,500	1,000	---	---	---	---	6.0	800
North Carolina	9	12.2	14,177	16,393	1,135	6,866	9,417	1,879	---	---	---	88.6	16,464
Puerto Rico	2	0.1	1,050	700	---	---	1,210	158	---	---	---	---	23,395
South Carolina	16	27.5	164,800	23,850	7,166	10,800	19,935	1,444	---	---	132	31.3	44,999
Tennessee	2	0.5	---	850	---	---	287	410	5,190	1,563	93	2.5	3,304
Texas	7	3.6	900	11,684	100	---	2,930	200	---	---	---	46.9	10,219
Virginia	1	---	---	---	---	2,820	1,671	---	---	---	---	---	152
Total	49	58.7	203,002	61,713	9,771	25,226	42,424	4,130	5,965	1,803	1,840	179.5	116,079
December Total	48	33.1	74,090	57,633	2,890	27,518	43,507	3,271	1,610	930	8,844	261.2	109,431

TABLE III — MCWA PERSONNEL ON DUTY ON JANUARY 31, 1944 AND TOTAL PAYROLL FOR MONTH OF JANUARY — JANUARY 1 - 31, 1944

STATE	Commissioned		Prof. & Sci.		Sub-Prof. (1)		C. A. F.		Custodial		Total		Percent of Total	
	No.	Pay	No.	Pay	No.	Pay	No.	Pay	No.	Pay	No.	Pay	No.	Pay
Alabama	5	1,389	1	264	2	365	2	337	36	4,591	46	6,946	1.5	1.7
Arkansas	6	1,727	3	952	20	3,928	5	1,002	51	7,196	85	14,805	2.9	3.7
California	2	570	---	---	6	1,213	2	458	20	2,809	30	5,050	1.0	1.3
D. C.	1	333	1	319	3	598	2	468	7	890	14	2,698	0.5	0.7
Florida	5	1,504	6	1,812	17	3,421	5	951	195	24,613	228	32,301	7.6	8.0
Georgia	6	1,769	3	906	33	6,223	5	793	92	11,459	139	21,150	4.7	5.2
Illinois	3	867	2	537	1	233	1	152	2	277	9	2,066	0.3	0.5
Indiana	2	570	1	264	---	---	1	146	6	795	10	1,775	0.3	0.4
Kentucky	2	570	3	527	3	619	1	164	11	9,591	20	11,471	0.7	2.8
Louisiana	10	2,851	6	1,897	42	8,033	5	915	297	37,698	360	51,394	12.1	12.8
Maryland	1	248	---	---	4	750	2	410	14	1,689	21	3,097	0.7	0.8
Mississippi	5	1,474	2	264	9	1,883	3	556	61	6,813	80	10,990	2.7	2.7
Missouri	4	816	1	264	13	2,453	1	152	11	1,395	30	5,080	1.0	1.3
North Carolina	6	1,719	6	1,991	10	1,993	3	574	192	22,752	217	29,029	7.3	7.2
Oklahoma	2	578	2	627	7	1,413	1	146	2	341	14	3,105	0.5	0.8
Puerto Rico	8	2,880	---	---	10	2,590	5	1,142	581	26,526	604	33,138	20.3	8.2
South Carolina	5	1,455	4	1,271	22	4,690	3	592	280	33,123	314	41,131	10.5	10.2
Tennessee	4	1,140	2	477	6	1,429	3	519	53	6,438	68	10,003	2.3	2.5
Texas	8	2,311	5	1,534	26	5,614	4	738	207	26,233	250	36,630	8.4	9.1
Virginia	3	855	2	688	11	2,228	2	428	122	14,910	140	19,109	4.7	4.7
AEDES AEGYPTI														
Florida	---	---	---	---	27	4,458	1	164	1	246	29	4,868	1.0	1.2
Georgia	2	868	---	---	9	1,724	2	173	1	257	14	3,022	0.5	0.7
Louisiana	1	285	1	264	16	2,942	1	146	---	---	19	3,637	0.6	0.9
South Carolina	1	285	---	---	12	2,074	1	164	2	250	16	2,773	0.5	0.7
Texas	5	1,425	2	405	17	3,114	2	187	11	1,555	37	6,686	1.2	1.7
H.Q. & Dist. (2)	62	20,737	7	2,064	18	2,562	89	14,757	9	893	185	41,013	6.2	10.2
Total	159	49,226	60	17,327	344	66,750	152	26,234	2,264	243,430	2,979	402,967	100.0	100.0
Percent of Total	5.3	12.2	2.0	4.3	11.6	16.6	5.1	6.5	76.0	60.4	100.0	100.0		

(1) Includes Entomological Inspectors
(2) Includes Headquarters and District Offices, malaria survey, Imported malaria control, special investigations and employees temporarily attached to Headquarters pending assignment to states.

MALARIA CONTROL IN WAR AREAS JAN. 1944

Monthly Report

PARIS GREEN DUSTING ON RICE

By Sheldon L. Lang, Assistant Engineer (R)

Last season when it was decided that the most economical and effective control of *Anopheles quadrimaculatus* breeding in the rice fields of Arkansas would be obtained by airplane dusting with paris green, the possibility of damage to the rice crop presented a major problem. While the results of airplane dusting on anopheline breeding had been well established by the work of the Tennessee Valley Authority, the United States Public Health Service and the Department of Agriculture, very little information was available regarding the effect on rice plants. Rice farmers were reluctant to grant easements until they were sure the dusting would cause no permanent injury.

In order to have definite information to present to the planters it was necessary to conduct tests to determine whether or not paris green dust would damage the rice plants. Accordingly, in June 1943, a one year experiment was begun in cooperation with the University of Arkansas Rice Branch Experiment Station at Stuttgart, Arkansas.

A two-acre section of Arkansas Fortuna rice, divided into ¼ acre sections was utilized. The rice was seeded on April 26, 1943, and emerged on May 4. Dusting operations were begun on June 19, when the plants were about one foot high. The plots were drained (allowed to dry up) beginning June 20 and were re-watered on June 25. Dusting was carried on at weekly intervals through August 18, and the plots were drained for harvesting on September 1. The crop was harvested on September 7. In all there were ten applications of dust.

RICE HEADS SHOWING GRAINS

Each of the eight plots was treated differently during the tests. At first two standard mixtures were made, one containing 18% paris green and 82% soapstone, and the other containing 8% paris green and 92% lime. The soapstone mixture was the one used in airplane dusting operations, while the lime mixture was the one used in hand operations in one of the malaria control areas. On July 28, a new lime mixture was used composed of 11% paris green and 89% lime.

The eight plots were dusted weekly as follows:

Plot No. 1 - Paris green and soapstone applied at the rate of ½ pound of paris green per acre per application.

Plot No. 2 - Paris green and lime applied at the rate of ½ pound of paris green per acre.

Plot No. 3 - Control plot - no dust applied.

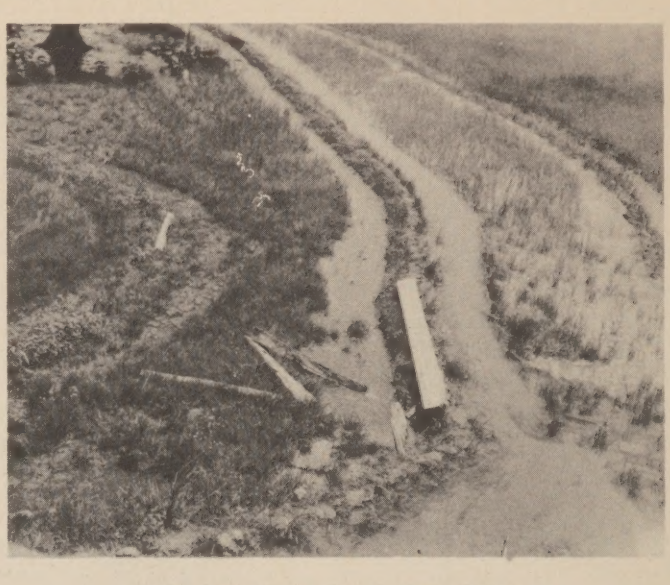
Plot No. 4 - Paris green and soapstone applied at the rate of one pound of paris green per acre.

Plot No. 5 - Paris green and lime applied at the rate of one pound of paris green per acre.

Plot No. 6 -Control plot - no dust applied.

Plot No. 7 - Paris green and soapstone applied at the rate of 1½ pounds of paris green per acre.

Plot No. 8 - Paris green and lime applied at the rate of 1½ pounds of paris green per acre.



RICE FIELD BEING FLOODED

All dust was applied with a hand operated Niagara rotary duster by a member of the regular larviciding crew. The required amount of dust for each plot was weighed before it was placed in the duster, and emptied with a uniform dispersion over its designated area.

AIRPLANE DUSTING RICE FIELD

During the experiment weekly inspections of the rice plants were made, and no adverse effects were noted. A slight brown discoloration was noted on the husks of the rice during the first part of August, but it was established that this occurred where the dust was being discharged from the nozzle of the duster, and the full discharge of dust hit the plants. This discoloration was confined to the husks and no effect was noted on the rice itself. No discoloration was noted where the dust had dispersed, floated, and settled on the rice.

Table IV presents yield data for the plots involved in the experiments.

The conclusions drawn from the one year experiment indicate that in the concentrations used the paris green mixtures had no appreciable effect on the yield of rice or straw. The concentration of 1½ pounds of paris green per acre is well above that normally used in larvicidal operations as one pound or less is usually applied. To complete these investigations it will be necessary to continue the same procedure over a number of years in order to determine the cumulative effect of the dust on the succeeding rice crops.

TABLE IV

Plot No.	Treatment	Cumulative Total P.G. lbs/acre	Cumulative Total Diluent lbs/acre	Size of plot Ft.	Total crop per plot lbs.	Grain per plot lbs.	Straw per plot lbs.	Grain per acre Bu.	Straw per acre Tons.
1	Paris green & soapstone ½ lb. paris green per acre	5	22.8	74x137	1352	592.0	760.0	56.52	1.63
2	Paris green & lime ½ lb. paris green per acre	5	50.0	74x137	1395	638.5	756.5	60.96	1.63
3	Control No dusting	0	0	74x137	1350	628.0	722.0	59.96	1.55
4	Paris green & soapstone 1 lb. paris green per acre	10	45.6	74x137	1505	705.0	800.0	67.31	1.72
5	Paris green & lime 1 lb. paris green per acre	10	100.1	74x137	1480	648.0	832.0	61.87	1.79
6	Control No dusting	0	0	74x137	1515	694.5	820.5	66.31	1.76
7	Paris green & soapstone 1½ lbs. paris green per acre	15	68.5	74x137	1475	670.5	804.5	64.02	1.73
8	Paris green & lime 1½ lb. Paris green per acre	15	150.2	74x137	1360	632.5	727.5	60.39	1.56

AN INSTANCE OF EFFICIENT ANOPHELINE CONTROL CAUSED BY NATURAL SEASONAL RIVER FLUCTUATIONS *

by C. F. Gerlach, Assistant Sanitarian (R)

A striking instance of natural phenomena causing variations in the yearly abundance of *Anopheles quadrimaculatus* occurred in the Savanna, Illinois area during the 1942-43 season.

Savanna is located on the banks of the Mississippi River in northwestern Illinois and is in close proximity to extensive marshes and shallow ponds, the water in which is affected by the stages of the river. These marshes and ponds were prolific sources of *A. quadrimaculatus* in 1942. The presence at Savanna of a large war establishment made it desirable to control production of this mosquito, and control work was begun during July of that year. Entomological records show that this work, while effecting a remarkable reduction of the *quadrimaculatus* populations, was not altogether successful in bringing them to satisfactory low levels. Plans were made, therefore, to undertake operations on a much larger scale in 1943.

During 1943, however, the *quadrimaculatus* abundance in the area never became sufficient to require any control work. This is shown by the data on densities presented in Table VI where it will be noted that single adult station counts never exceeded five mosquitoes during 1943 in stations either inside or outside of the control zone. This is in marked contrast to conditions during 1942 when single station counts reached 6,000. These records were collected from a series of 10 index stations, eight of which were inside and two outside the limits of the control zone. Only maximum counts from individual stations over the indicated periods are included as these are sufficient for comparative purposes. In addition to the data presented in the table, however, a large number of records of *quadrimaculatus* populations at other points in the area are available and these also indicate an almost total absence of this mosquito in 1943.

An explanation for this condition is furnished by the fluctuating water levels in the breeding areas which were caused by repeated floods of the river during 1943. The hydrographs for 1942 and 1943 of the Mississippi River at Sabula, Iowa, which is just across the river from Savanna, are presented in Figure 1. These show that conditions in 1943 were decidedly different from those of 1942. During 1943, from about the middle of March until August there was a continuous series of water level fluctuations which were so frequent and pronounced that plant development was either definitely restricted or completely inhibited and floatage was regularly stranded. As a result, the conditions which were so favorable for anopheline breeding in 1942 either did not develop or failed to persist long enough to allow any considerable emergence of these mosquitoes.

This example of natural control of the malaria vector clearly demonstrates the value of regulating larvicidal work by entomological findings. Had the control program indicated as necessary by 1942 conditions been carried on, phenomenal results could have been claimed. However, nature itself produced perfect control and no artificial measures were required.

* Abstract prepared by L. E. Perry, Assistant Sanitarian (R).

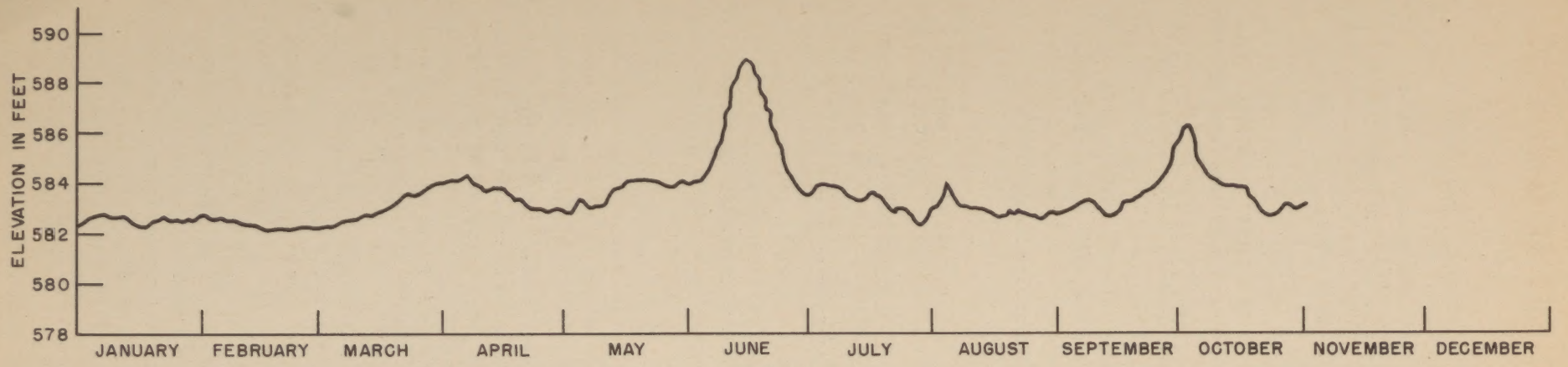


FIGURE 1

1942

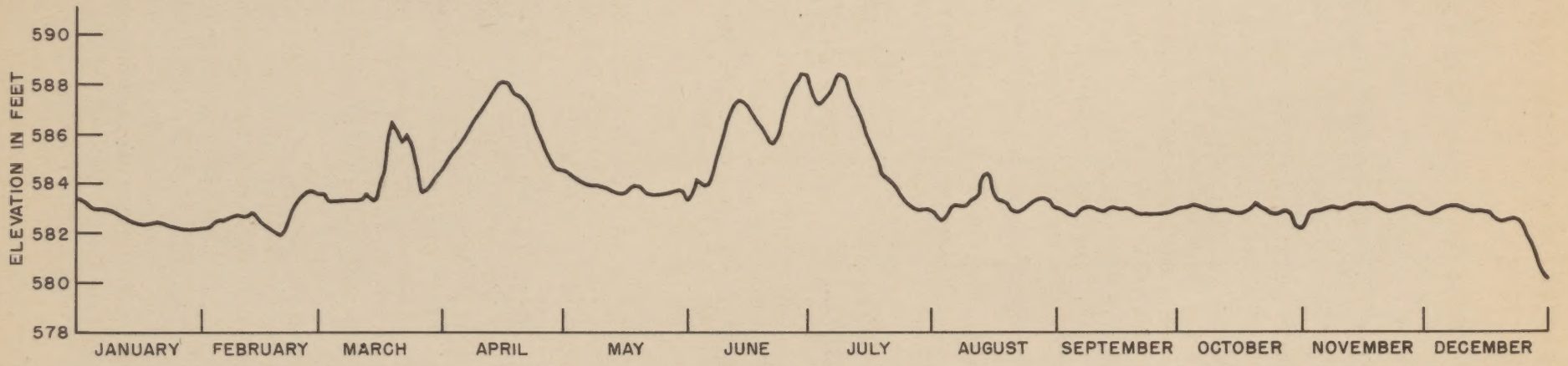


FIGURE 2

1943

HYDROGRAPH OF MISSISSIPPI RIVER

SABULA, IOWA

TABLE V

DENSITIES OF *A. QUADRIMACULATUS* AT SAVANNA, ILLINOIS, 1942-1943

Maximum nunbers observed at any index station for indicated period.

Year	Location	June	July	August	September	October
1942	Inside control zone	–	26	36	26	11
	Outside control zone	–	51	171	6,000	500
1943	Inside control zone	0	1	3	2	0
	Outside control zone	0	0	5	5	0

* * *

"ADULT STATIONS"

Changes in Station -

Albert E. Weyer, Assistant Sanitarian (R), Houston, Texas; Irving Gerring, P. A. Sanitarian (R), Atlanta, Georgia; Newton F. Hardman, Assistant Sanitarian (R), San Francisco, California; Donald J. Schliessmann, Assistant Sanitary Engineer (R), Orange, Texas.

New Commissions

Victor Tiship, Assistant Sanitarian (R); Melvin H. Goodwin, Jr., Assistant Sanitarian (R); James A. Morrow, Assistant Sanitarian (R); Deed C. Thurman, Jr., Assistant Sanitarian (R); Thomas D. Virgilio, Assistant Engineer (R); Fred C. Harmston, Assistant Sanitarian (R); Michael Gold, Assistant Engineer (R); Emerson R. Baker, Assistant Sanitarian (R); Robert C. Ball, Assistant Sanitarian (R); Charles E. Gerhardt, Assistant Sanitarian (R).

VIRGINIA REPAIRS ITS OWN MOTOR VEHICLES *

The motor vehicle equipment assigned to the Malaria Control in War Areas program in Virginia consists of 19 trucks, two station wagons, and three passenger vehicles, most of which are 1939, 1940, and 1941 models. Almost all of the equipment when received was used and in need of both minor and major repairs. A number of trucks were in such poor condition that they required almost complete rebuilding before they could be used on the program. Motor vehicle repair work obtained by private contract in the congested areas in Virginia was found to be extremely expensive and unsatisfactory. In a number of cases it required weeks and sometimes months to get even a small repair job accomplished, and the equipment was steadily deteriorating from lack of proper maintenance.

As two of the MCWA workers were well qualified mechanics, and several had had mechanical experience, it was decided to set up a shop and repair all the vehicles during the winter of 1943-44. A small quantity of repair equipment and small tools was obtained from old WPA stock and an additional supply was ordered locally. The local order has never been completely filled. The mechanics supplemented what could be obtained with their own tools brought from home or tools borrowed from other mechanics.

Almost all of the trucks were in urgent need of painting and as their colors varied all the way from black to yellow, it was decided to paint them all a uniform color. A dull enamel grey was selected and applied with a spray gun obtained from WPA and an air compressor rented from a local concern. It is planned to letter "Malaria Control in War Areas, U.S. Public Health Service, Federal Security Agency" on each side of each vehicle.

Two foremen and three laborers were assigned to repair work. On rainy days when no outside work is possible, other laborers are assigned to work on the trucks. These men are divided into two crews. While one crew is taking out the motor for repairs, another crew is disassembling the body for painting and repairs. There are usually two or more vehicles in for repairs at one time so that work need never be held up for lack of repair parts for any one vehicle. While the trucks are in the shop the tires are inspected and are replaced or recapped if needed.

Work was initiated on the equipment in worst need of repair, and to date seven trucks, two station wagons, and one passenger car have been completely rebuilt, including motor and body repairs and a new paint job. With ten vehicles already repaired, Virginia is well on the way towards a complete job. It is planned to have all the trucks in first class condition by April 1, 1944.

The following table shows in detail the cost for labor and materials to repair the vehicles thus far completed:

* Dr. I. C. Riggin, Virginia State Health Officer, has designated the Essex Building, Norfolk, Virginia as Headquarters for the Virginia MCWA program with Assistant State Director R. E. Dorer in charge.

TABLE VI

Motor Vehicle & Type	Material & Cost		Work & Man Hours	
#1049				
Passenger Car	Parts	51.72	Mechanical Repair	98 hr.
	Recapping		Waxing & Polishing	24 hr.
	Tires	14.62		122 hr.
		66.34		
#1048				
Station Wagon	Parts	23.60	Mechanical Repair	32 hr.
	Recapping	5.69	Body Repair & Painting	140 hr.
	Paint	6.90	Changing Tires	8 hr.
		36.19		180 hr.
#1035				
½-Ton Truck	Parts	12.88	Mechanical Repair	16 hr.
	Recapping	12.28	Body Repair & Painting	58 hr.
	Paint	7.35	Changing Tires	8 hr.
		32.51		82 hr.
#1045				
1½-Ton Truck	Parts	215.71	Mechanical Repair	136 hr.
	Recapping	57.02	Body Repair & Painting	168 hr.
	Paint	11.03	Changing Tires	28 hr.
		283.76		332 hr.
#1030				
½-Ton Truck	Parts	10.71	Mechanical Repair	36 hr.
	Paint	10.58	Body Repair & Painting	100 hr.
		21.29		136 hr.
#1043				
1½-Ton Truck	Parts	124.01	Mechanical Repair	164 hr.
	Paint	13.28	Body Repair & Painting	166 hr.
		137.29		330 hr.
#1036				
½-Ton Truck	Parts	40.76	Mechanical Repair	90 hr.
	Paint	10.58	Body Repair & Painting	216 hr.
		51.34		306 hr.
#1040				
1½-Ton Truck	Parts	17.50	Mechanical Repair	90 hr.
	Paint	13.28	Body Repair & Painting	130 hr.
		30.78		226 hr.
#1047				
Station Wagon	Parts	50.98	Mechanical Repair	104 hr.
	Paint	6.90	Body Repair & Painting	180 hr.
		57.88		284 hr.
#1038				
1½-Ton Truck	Parts	56.78	Mechanical Repair	116 hr.
	Paint	19.76	Body Repair & Painting	200 hr.
	Recapping	40.03	Changing Tires	20 hr.
		116.57		336 hr.

Editor's Note

This paper is presented as an example of the manner in which a problem vital to the prosecution of the MCWA program has been solved in one state and not with the idea of stimulating establishment of repair shops in all states. There are several factors which make this scheme practical in Virginia. MCWA projects in Virginia are located in extremely congested areas where automotive repair facilities are inadequate to carry the additional load caused by war activities. Used tools and equipment were obtainable from WPA at reasonable cost. MCWA in Virginia had a number of experienced mechanics who were not only available to provide the necessary skilled man power but who also furnished tools which could not be obtained otherwise.

In view of the extreme difficulty in obtaining automotive equipment it is imperative that existing equipment be conserved to the greatest extent possible. Through careful conservation the equipment on the Virginia program has been maintained in good operating condition in spite of its age.

* * *

TABLE VII

MCWA Encumbrances and Liquidations by Major Items
For the Month of January 1944

	Continental U.S.	Percentage of Total	Puerto Rico	Percentage of Total
.01 Personal Services	$ 369,828.56	83.40	$ 33,138.21	89.30
.02 Travel	22,092.69	4.98	209.47	0.56
.03 Transportation	901.36	0.21	200.00	0.54
.04 Communication Services	1,316.49	0.29	25.00	0.07
.05 Rents and Utilities	1,869.76	0.43	--------	----
.06 Printing and Binding	---------	----	--------	----
.07 Other Contractual Services	7,498.66	1.69	64.50	0.18
.08 Supplies and Materials	27,907.10	6.29	3,428.80	9.25
.09 Equipment	11,998.80	2.71	36.68	0.10
Total	$ 443,413.42	100.00	$ 37,102.66	100.00
Expenses other than Personal Services	73,584.86	16.60	3,964.45	10.70

MALARIA DEATHS PER 1,000 SQUARE MILES
1938 – 1942